

PATENT COOPERATION TREATY

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From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

Christie, Parker & Hale, LLP

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① T3
② BL4

To: THOMAS J. DALY
CHRISTIE, PRAKER & HALE, LLP
P.O. BOX 7068
PASADENA, CA 91109-7068

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

CASE # 33683 PCT ACTION _____
REMINDER _____ DUE DATE _____
DEADLINE _____

Date of Mailing (day/month/year) **06 NOV 2001**

Applicant's or agent's file reference

33683P/T358

IMPORTANT NOTIFICATION

International application No.

PCT/US99/13934

International filing date (day/month/year)

22 JUNE 1999

Priority Date (day/month/year)

NONE

Applicant

TRISEP CORPORATION

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

SUN UK KIM

[Signature]

Telephone No. (703) 308-0661

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

REC'D 09 NOV 2001

WIPO PCT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 33683P/T358	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US99/13934	International filing date (day/month/year) 22 JUNE 1999	Priority date (day/month/year) NONE
International Patent Classification (IPC) or national classification and IPC Please See Supplemental Sheet.		
Applicant TRISEP CORPORATION		

1.	This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2.	This REPORT consists of a total of <u>7</u> sheets.
<input checked="" type="checkbox"/>	This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
	These annexes consist of a total of <u>2</u> sheets.
3.	This report contains indications relating to the following items: <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step or industrial applicability IV <input checked="" type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability, citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input checked="" type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 15 DECEMBER 2000	Date of completion of this report 20 SEPTEMBER 2001
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer SUN UK KIM
Facsimile No. (703) 305-3230	Telephone No. (703) 308-0661

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/13934

I. Basis of the report1. With regard to the **elements** of the international application: *☐ the international application as originally filed☒ the description:

pages _____ (See Attached) _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☒ the claims:

pages _____ (See Attached) _____, as originally filed
pages _____, as amended (together with any statement) under Article 19
pages _____, filed with the demand
pages _____, filed with the letter of _____

☒ the drawings:

pages _____ (See Attached) _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☒ the sequence listing part of the description:

pages _____ (See Attached) _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☐ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:☐ contained in the international application in printed form.☐ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.4. ☒ The amendments have resulted in the cancellation of:☒ the description, pages _____ NONE _____☒ the claims, Nos. _____ NONE _____☒ the drawings, sheets/fig _____ NONE _____5. ☐ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

**Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/13934

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☒ paid additional fees.
- ☐ paid additional fees under protest.
- ☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
- ☒ not complied with for the following reasons:

Please See Supplemental Sheet.

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report

- ☒ all parts.
- ☐ the parts relating to claims Nos. .

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/13934

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. statement**

Novelty (N)	Claims	<u>1-14, 28-65</u>	YES
	Claims	<u>15-27</u>	NO
Inventive Step (IS)	Claims	<u>12-14, 47, 52-65</u>	YES
	Claims	<u>1-11, 15-46, 48-51</u>	NO
Industrial Applicability (IA)	Claims	<u>1-65</u>	YES
	Claims	<u>NONE</u>	NO

2. citations and explanations (Rule 70.7)

Claims 15-27 lack novelty under PCT Article 33(2) as being anticipated by European Patent Application 581,544 (hereinafter referred to as EPA '544). EPA '544 teaches a membrane filter layer comprising a membrane film over a non-woven support substrate having a Frazier air permeability of 0.5 to 1000 cfm/sq. foot and weight about 0.5 to 10 oz./sq. yard and thickness of 1 to 15 mils wherein EPA '544 teaches adhesives used in preparing the spiral wound element (see page 3, lines 12-21; page 6, lines 38-42).

Claims 1-11 and 44 lack an inventive step under PCT Article 33(3) as being obvious over EPA '544 in view of U.S. Patent No. 5,069,798 (hereinafter referred to as Kaschemekat et al.) and U.S. Patent No. 5,352,362 (hereinafter referred to as Mizutani et al). EPA '544 teaches a spiral wound membrane filtration element comprising a permeate spacer and a feed spacer and a membrane filter layer as described above wherein membrane layers surrounds a permeate spacer (abstract; see col. 2, line 28 - col. 3, line 57). Claims 1-11 and 44 essentially differ from the filtration element of EPA '544 in reciting that a feed spacer sheet is in between layers of membrane filter layer sheets and the membrane filter filtration element is backflushable. Kaschemekat et al teach a spiral wound filtration element comprising a permeate spacer and a feed spacer and a membrane filter layer comprising a membrane film over a supported substrate wherein the feed spacer is inserted between membrane envelopes (see col. 10, line 34 - col. 11, line 43). Mizutani et al teach a backflushing method and system for cleaning microporous filtration membrane (see figure 1; col. 7, lines 38-57; col. 9, line 57 - col. 12, line 11). It would have been obvious to use an alternative configuration of a feed spacer instead of a permeate spacer placed between membrane layers sheets in spiral wound membrane filtration element capable of being backflushed for cleaning the membrane.

Claims 28-43 lack an inventive step under PCT Article 33(3) as being obvious over U.S. Patent No. 5,236,643 (hereinafter referred to as Tseng et al) in view of EPA '544. Tseng et al teach a method of making a membrane filter layer comprising the (Continued on Supplemental Sheet.)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/13934

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

Claim 2 is objected to under PCT Rule 66.2(a)(iii) as containing the following defect(s) in the form or contents thereof:
Recitation of "0.10."" on line 2 should be corrected to

—0.10"—.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/13934

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

CLASSIFICATION:

The International Patent Classification (IPC) and/or the National classification are as listed below:

IPC(7): B01D 61/00, 63/10, 69/00, 69/10 and US Cl.: 210/106, 108, 109, 110, 111, 116, 117, 257.1, 257.2, 258, 321.69, 321.7, 321.78, 321.86, 321.87, 323.1, 332, 333.01, 333.1, 407, 408, 409, 410, 411, 412, 416.1, 433.1, 483, 488, 490, 496, 497.01, 497.1, 791, 797, 798, 805; 264/41, 45.1, 45.8, 216, 232, 233, 340

I. BASIS OF REPORT:

This report has been drawn on the basis of the description,
page(s) 1-18, as originally filed.
page(s) NONE, filed with the demand.
and additional amendments:
NONE

This report has been drawn on the basis of the claims,
page(s) 21-26, as originally filed.
page(s) NONE, as amended under Article 19.
page(s) NONE, filed with the demand.
and additional amendments:
Pages 19-20, filed with the letter of 06 July 2001.

This report has been drawn on the basis of the drawings,
page(s) 1-6, as originally filed.
page(s) NONE, filed with the demand.
and additional amendments:
NONE

This report has been drawn on the basis of the sequence listing part of the description:
page(s) NONE, as originally filed.
pages(s) NONE, filed with the demand.
and additional amendments:
NONE

IV. LACK OF UNITY OF INVENTION:

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2, and 13.3 is not complied with for the following reasons:

This application contains the following inventions or groups of inventions which are not so linked as to form a single inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-44, drawn to a spiral wound membrane filtration element and a method of making thereof.

Group II, claims 45-52, drawn to a backflush system and a method of using thereof having a feed diverter valve and a concentrate diverter valve.

Group III, claims 53-65, drawn to a backflush system and a method of using thereof having a bubbler and a vacuum system.

The inventions listed as Groups I-III do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The "special technical feature" of claim 1 is a spiral wound membrane filtration element comprising a permeate carrier sheet, a membrane filter layer sheet and a feed spacer sheet which is shown by European Patent Application 581,544 (see page 2, line 28 - page 3, line 3) to lack novelty or inventive step and does not make a contribution over the prior art. All of the groupings are directed to a method or apparatus for a spiral wound membrane filtration element, but each group has a different special technical feature not shared by the remaining groups. Group II is directed to a backflush system which has the special technical feature of a feed diverter valve and a concentrate diverter valve not shared by any of the remaining groups. Group III is directed to a backflush system which has the special technical feature of a bubbler and a vacuum system not shared by any of the remaining groups.

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 11

V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):

steps of placing a casting solution of cellulose acetate solution on a passing support by a doctor blade and immersing a supported membrane in water to quench and drying with air (see figure 3; col. 3, line 5 - col. 4, line 59). Claims 28-43 essentially differs from the method of Tseng et al in reciting a support substrate with a Frazier air permeability between 0.1 and 10 cfm/sq. feet. EPA '544 teaches a membrane film casted on a non-woven support substrate having a Frazier air permeability of 0.5 to 1000 cfm/sq. foot which improves membrane element long-term performance and improves a vacuum tightness of the resulting membrane element (see page 3, lines 12-21; page 6, lines 38-42). It would have been obvious to substitute a support substrate with a Frazier air permeability between 0.1 and 10 cfm/sq. feet for the support substrate in Tseng et al for improved membrane element for long-term performance and vacuum tightness of the resulting membrane element.

Claims 45-46 and 48-51 lack an inventive step under PCT Article 33(3) as being obvious over Mizutani et al in view of EPA '544. Mizutani et al teach a backflushing method and system for cleaning microporous filtration membrane comprising a feed solution (1) pumped to filtration element (70) by a feed pump (5) through a diverter valve (9), a source of compressed gas (18) for backflushing the filtration element (70) and a concentrate diverter valve (16) for regulating concentrate wherein gas and/or water backflushing of filtration element is controlled by a controller (see figure 1; col. 7, lines 38-57; col. 9, line 57 - col. 12, line 11). Claims 45-46 and 48-51 essentially differs from the method and system of Mizutani et al in reciting a spiral wound membrane filtration element. EPA '544 teaches a spiral wound membrane filtration element which has 0.1 micron pores (see page 6, lines 38-41). It would have been obvious to use backflush system and method of Mizutani et al to clean a spiral wound membrane filtration element which is a microporous filtration membrane.

Claims 12-14, 47 and 52-65 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the method of claim 12 for making a back-flushable spiral wound membrane filtration element comprising forming a membrane filter layer sheet with a support substrate having a Frazier air permeability between 0.1 and 10 cfm/ sq. feet., placing a cut piece of feed spacer sheet on top of the membrane filter layer sheet, the width of the feed spacer sheet being approximately half the width of the membrane filter layer sheet and folding the membrane filter layer sheet over the feed spacer so that the feed spacer sheet is sandwiched between two layers of the membrane filter layer sheet, the method of claim 47 comprising the steps of holding permeate for the back-flush step using a permeate accumulator and controlling the flow of permeate out of the permeate accumulator and the flow rate of the backflush gas while backflushing using a permeate diverter valve and the method of claim 52 comprising the backflush fluid comprising permeate followed by compressed air, the backflush system of claim 53 for a spiral wound membrane element comprising a bubbler having bubbles acting as a turbulence promoters at the surface of the membrane filter layer sheet and a vacuum system for creating a driving pressure to force the feed solution into a membrane filtration element and the backflushing method of claim 59 comprising the steps of promoting turbulence at a surface of the membrane filter layer sheet through a bubbler having bubbles and introducing on a periodic basis a pressurized back flush fluid. Claims 13-14 depend on novel and nonobvious claim 12. Claims 54-58 depend on novel and nonobvious claim 53. Claims 60-65 depend on novel and nonobvious claim 59.

Claims 1-65 have industrial applicability as defined by PCT Article 33(4) because the claimed subject matter can be made and/or used in filtration industry.

----- NEW CITATIONS -----

US 5,069,793 A (Kaschemekat et al) 03 December 1991, see col. 10, line 34 - col. 11, line 43.

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44/13934
IPER/US 06 JULY 2001

1 CLAIMS:

1. A spiral wound membrane filtration element capable of being back-flushed comprising:
a permeate carrier sheet;
5 a membrane filter layer sheet adhesively bonded to the permeate carrier sheet, and having a support substrate, and a membrane film over the support substrate; and
a feed spacer sheet in between layers of membrane filter layer sheets;
wherein the support substrate has a Frazier air permeability between 0.1 and 10 cfm/ft;
wherein the membrane filter layer sheet is adhesively bonded to the permeate carrier with
10 adhesive capable of retaining the bond during element back-flushing.
wherein the feed spacer sheet, the membrane filter layer sheets, and the permeate carrier sheet are wrapped around a permeate collection tube.
2. The element of claim 1 wherein the feed spacer sheet has a thickness between 0.02" and 0.10."
3. The element of claim 2 wherein the feed spacer sheet has a thickness between 0.04" and 0.06."
- 20 4. The element of claim 1 wherein fluid is capable of flowing through the support substrate and the membrane film does not delaminate from the substrate during the back-flushing cycle.
5. The element of claim 1 wherein the membrane filtration element utilizes a micro-filtration process.
- 25 6. The element of claim 1 wherein the membrane filtration element utilizes an ultrafiltration process.
7. The element of claim 1 wherein the membrane filtration element utilizes a nanofiltration process.
- 30 8. The element of claim 1 wherein the membrane filtration element utilizes a reverse osmosis process.
- 35 9. The element of claim 1 wherein there are multiple layers of the membrane filter layer sheets, feed spacer sheets, and permeate carrier sheets wrapped around the permeate collection tube.

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IPET/US 06 JULY 2001

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10. The element of claim 1 wherein the membrane filter layer sheet is adhesively bonded to the permeate carrier sheet with adhesive having an overlap shear strength of at least 300 psi.

5

11. The element of claim 10 wherein the adhesive is manufactured by E.V. Roberts of Culver City, California, model number 1752.

10

12. A method of making a back-flushable spiral wound membrane filtration element having a filter layer and a permeate collection tube, the method comprises:
forming a membrane filter layer sheet with a support substrate having a Frazier air permeability between 0.1 and 10 cfm/ft²;

15

cutting the membrane filter layer sheet to a desired length;
placing a cut piece of a feed spacer sheet on top of the membrane filter layer sheet, the width of the feed spacer sheet being approximately half the width of the membrane filter layer sheet;

20

folding the membrane filter layer sheet over the feed spacer so that the feed spacer sheet is sandwiched between two layers of the membrane filter layer sheet;
attaching a center side part of a permeate carrier sheet to the permeate collection tube;
applying an adhesive seal on the permeate carrier sheet along sides other than the center side part;

25

positioning the membrane filter layer sheet-feed spacer sheet sandwich over the permeate carrier sheet such that the adhesive seal bonds the membrane filter layer sheet to the permeate carrier sheet; and

wrapping the permeate carrier sheet, the membrane filter layer sheet, and the feed spacer sheet around the permeate collection tube.

30

13. The method of claim 12 further comprising preventing feed solution from entering the permeate collection tube.

14. The method of claim 12 wherein the back-flush, pressure-resistant adhesive is manufactured by E.V. Roberts of Culver City, California, model number 1752.

35

15. A membrane filter layer sheet for a spiral wound membrane filtration element capable of being back flushed, the filter sheet comprising:
a support substrate; and
a membrane film over the support substrate;
wherein the support substrate has a Frazier air permeability between 0.1 and 10 cfm/ft².

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 33683P/T358	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/US 99/ 13934	International filing date (day/month/year) 22/06/1999	(Earliest) Priority Date (day/month/year)
Applicant TRISEP CORPORATION et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 5 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☒ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

5

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 99/13934

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-44

A spiral wound membrane filtration element capable of being back-flushed, a membrane filter layer sheet for it; method for making the membrane filtration element and the membrane filter layer sheet.

2. Claims: 45-65

Back-flush system for a spiral wound membrane filtration element and method of cleaning (back-flushing) a spiral wound membrane element.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/13934

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 912 624 A (JAMES L. JENNINGS) 14 October 1975 (1975-10-14) the whole document ---	45-65
A	US 5 352 362 A (MASUMI MIZUTANI ET AL.) 4 October 1994 (1994-10-04) the whole document ---	45-65
A	US 4 767 539 A (DOUGLAS L. FORD) 30 August 1988 (1988-08-30) the whole document ---	45-65
A	EP 0 669 159 A (DIC DEGRÉMONT KK) 30 August 1995 (1995-08-30) the whole document -----	45-65

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/13934

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 581544	A	02-02-1994	US 5275726 A CA 2097632 A,C DE 69313757 D DE 69313757 T ES 2106284 T JP 6154564 A MX 9303430 A SG 46586 A	04-01-1994 30-01-1994 16-10-1997 19-02-1998 01-11-1997 03-06-1994 29-07-1994 20-02-1998
EP 584411	A	02-03-1994	JP 6086916 A US 5152898 A US 4992176 A US 5192445 A DE 69210235 D DE 69210235 T JP 3151029 A CA 2026660 A CA 2073099 A DE 69027572 D DE 69027572 T EP 0425108 A CA 2049169 A DE 69104685 D DE 69104685 T EP 0480599 A JP 5076739 A	29-03-1994 06-10-1992 12-02-1991 09-03-1993 30-05-1996 05-09-1996 27-06-1991 24-04-1991 04-01-1994 01-08-1996 31-10-1996 02-05-1991 12-04-1992 24-11-1994 16-03-1995 15-04-1992 30-03-1993
US 5236643	A	17-08-1993	NONE	
WO 9532041	A	30-11-1995	AU 7354494 A	18-12-1995
US 3912624	A	14-10-1975	NONE	
US 5352362	A	04-10-1994	CA 2091296 A GB 2264883 A,B JP 6025655 A	10-09-1993 15-09-1993 01-02-1994
US 4767539	A	30-08-1988	AT 84243 T AU 563321 B AU 3440084 A WO 8501449 A DE 3486031 A EP 0160014 A JP 6059393 B JP 61500011 T	15-01-1993 02-07-1987 23-04-1985 11-04-1985 18-02-1993 06-11-1985 10-08-1994 09-01-1986
EP 669159	A	30-08-1995	JP 7236818 A	12-09-1995

PATENT COOPERATION TREATY

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JUL 08 2000

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

Christie, Parker & Hale, LLP

To:
 CHRISTIE, PARKER & HALE, LLP
 Attn. AUCIELLO, L.
 Post Office Box 7068
 Pasadena, California 91109-7068
 UNITED STATES OF AMERICA

CASE # 33683 PCT ACTION 19/19 Amendment (16 mon)

REMINDER 10/22/00

DEADLINE 10/22/00

NOTIFICATION OF TRANSMITTAL OF
 THE INTERNATIONAL SEARCH REPORT
 OR THE DECLARATION

(PCT Rule 44.1)

① IJD
 ② LGA

Applicant's or agent's file reference 33683P/T358	Date of mailing (day/month/year) 03/07/2000
International application No. PCT/US 99/ 13934	International filing date (day/month/year) 22/06/1999
Applicant TRISEP CORPORATION et al.	

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:
 The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland
 Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.


☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within **20 months** from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority  European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Toñi Muñoz-Manneken
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NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments and any accompanying statement, under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the time of filing the amendments (and any statement) with the International Bureau, also file with the International Preliminary Examining Authority a copy of such amendments (and of any statement) and, where required, a translation of such amendments for the procedure before that Authority (see Rules 55.3(a) and 62.2, first sentence). For further information, see the Notes to the demand form (PCT/IPEA/401).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 33683P/T358	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/US 99/ 13934	International filing date (day/month/year) 22/06/1999	(Earliest) Priority Date (day/month/year)
Applicant TRISEP CORPORATION et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 5 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☒ Unity of invention is lacking (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

5

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 99/13934

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-44

A spiral wound membrane filtration element capable of being back-flushed, a membrane filter layer sheet for it; method for making the membrane filtration element and the membrane filter layer sheet.

2. Claims: 45-65

Back-flush system for a spiral wound membrane filtration element and method of cleaning (back-flushing) a spiral wound membrane element.

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/IS 99/13934

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B01D63/10 B01D65/02 B01D69/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B01D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 581 544 A (EXXON RESEARCH AND ENGINEERING COMPANY) 2 February 1994 (1994-02-02)	15-27
A	the whole document	1-14, 28-44
A	EP 0 584 411 A (TEXACO DEVELOPMENT CORPORATION) 2 March 1994 (1994-03-02)	
A	US 5 236 643 A (TSAI-WIE TSENG ET AL) 17 August 1993 (1993-08-17)	
A	WO 95 32041 A (MEMTEC AMERICA) 30 November 1995 (1995-11-30) the whole document	45-65
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Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

Date of the actual completion of the international search

23 June 2000

Date of mailing of the international search report

03.07.00

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Bogaerts, M

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/13934

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 912 624 A (JAMES L. JENNINGS) 14 October 1975 (1975-10-14) the whole document ---	45-65
A	US 5 352 362 A (MASUMI MIZUTANI ET AL.) 4 October 1994 (1994-10-04) the whole document ---	45-65
A	US 4 767 539 A (DOUGLAS L. FORD) 30 August 1988 (1988-08-30) the whole document ---	45-65
A	EP 0 669 159 A (DIC DEGRÉMONT KK) 30 August 1995 (1995-08-30) the whole document -----	45-65

INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

PCT/US 99/13934

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EP 581544	A	02-02-1994	US 5275726 A CA 2097632 A,C DE 69313757 D DE 69313757 T ES 2106284 T JP 6154564 A MX 9303430 A SG 46586 A	04-01-1994 30-01-1994 16-10-1997 19-02-1998 01-11-1997 03-06-1994 29-07-1994 20-02-1998
EP 584411	A	02-03-1994	JP 6086916 A US 5152898 A US 4992176 A US 5192445 A DE 69210235 D DE 69210235 T JP 3151029 A CA 2026660 A CA 2073099 A DE 69027572 D DE 69027572 T EP 0425108 A CA 2049169 A DE 69104685 D DE 69104685 T EP 0480599 A JP 5076739 A	29-03-1994 06-10-1992 12-02-1991 09-03-1993 30-05-1996 05-09-1996 27-06-1991 24-04-1991 04-01-1994 01-08-1996 31-10-1996 02-05-1991 12-04-1992 24-11-1994 16-03-1995 15-04-1992 30-03-1993
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US 4767539	A	30-08-1988	AT 84243 T AU 563321 B AU 3440084 A WO 8501449 A DE 3486031 A EP 0160014 A JP 6059393 B JP 61500011 T	15-01-1993 02-07-1987 23-04-1985 11-04-1985 18-02-1993 06-11-1985 10-08-1994 09-01-1986
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